Center Innovation Fund: GSFC CIF

The Electrostatic Actuated Next Generation Microshutter Arrays (EA - NGMSA)

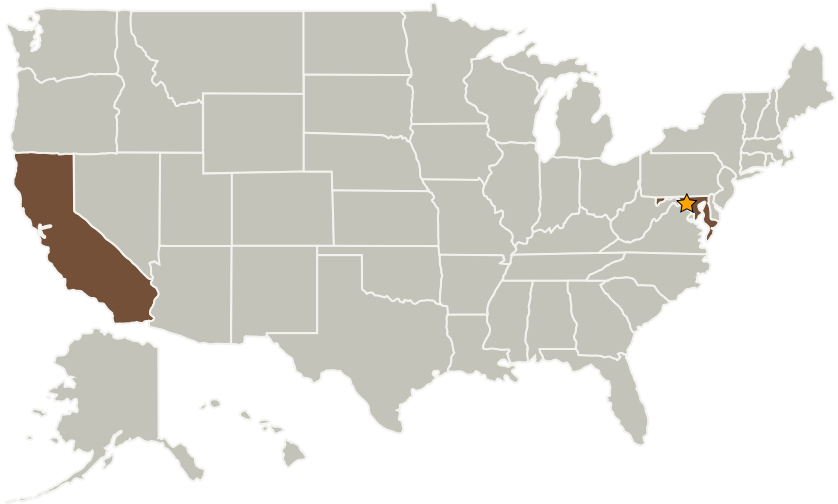
Completed Technology Project (2014 - 2015)

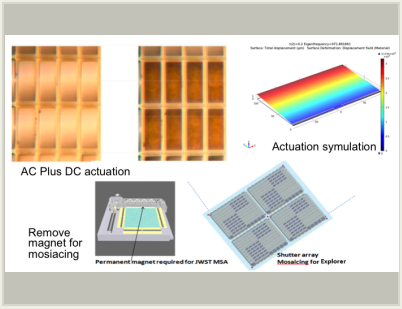
Project Introduction

The field of view required for future missions is much larger than James Webb Space Telescope (JWST). We need to use electrostatic actuation to replace magnetic actuation, so that Next Generation Microshutter arrays (NGMSA) can be scalable to cover large field of view of future telescopes. Our ultimate goal is to develop an extendable electrostatic actuated microshutter array system anticipating the Explorers and other future flight missions in the next two decades. The development of Electrostatic Actuated Next Generation Microshutter Array (EA- NGMSA) as a multi-object field selector for the proposed Explorer Class Missions. This field selector will improve instrument efficiency by up to three orders of magnitude, providing large improvements in performance for optical and UV telescopes, as well as IR systems.

We have recently demonstrated electrostatic actuation using electrostatic force to create a concept of an electrically addressable microshutter array. This is a crucial breakthrough which opens the path to a very large focal plane field selectors. We will further investigate an electrostatic actuation mechanism to reduce actuation voltage and to simplify the actuation process. Electrostatic actuation is critical to enabling MSA actuation and maintaining robust reliable devices. Besides the demonstration of electrostatic actuation of the microshutters, we demonstrated 2-D addressing of the shutters in a NGMSA array. Shutters can be randomly selected open, latch, hold and released close. The development already brought us a ROSES-APRA support (2011-2014 & 2015-2017).

Primary U.S. Work Locations and Key Partners





Low-Voltage Next Generation Microshutter Array

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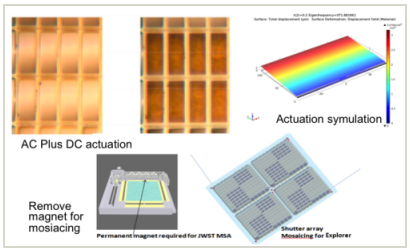
The Electrostatic Actuated Next Generation Microshutter Arrays (EA - NGMSA)

Completed Technology Project (2014 - 2015)

Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
California Institute of Technology(CalTech)	Supporting Organization	Academia	Pasadena, California
Johns Hopkins University	Supporting Organization	Academia	Baltimore, Maryland

Primary U.S. Work Locations	
California	Maryland

Images



Low-Voltage Next Generation Microshutter Array Project
Low-Voltage Next Generation Microshutter Array
(https://techport.nasa.gov/image/2565)

Links

GSC-16149-1
(no url provided)

GSC-171600-1
(no url provided)

GSC-17355-1
(no url provided)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Innovation Fund: GSFC CIF

Project Management

Program Director:
Michael R Lapointe

Program Manager:
Peter M Hughes

Project Manager:
Terence A Doiron

Principal Investigator:
Mary J Li

The Electrostatic Actuated Next Generation Microshutter Arrays (EA - NGMSA)

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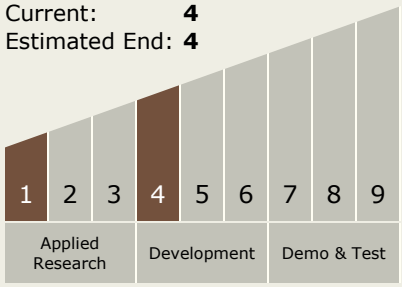
Project Website:

http://sciences.gsfc.nasa.gov/sed/

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes